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Abstract

Background

Little information has been published about the mortality of the Métis people of Canada. This study describes mortality patterns among Métis and Registered Indian adults, compared with the non-Aboriginal population.

Data source and methods

The 1991 to 2001 Canadian census mortality follow-up study tracked mortality among a 15% sample of respondents aged 25 or older, including 11,800 Métis, 56,700 Registered Indians and 2,624,300 non-Aboriginal adults, all of whom were enumerated by the 1991 census long-form questionnaire. Age-specific and age-standardized mortality rates and period life tables based on the number of person-years at risk were calculated across the various groups. Métis were defined by ethnic origin (ancestry).

Results

Compared with non-Aboriginal members of the cohort, life expectancy at age 25 was 3.3 and 5.5 years shorter for Métis men and women, respectively, and 4.4 and 6.3 years shorter for Registered Indians. For both Aboriginal groups, mortality rate ratios were highest at younger ages. Mortality rate differences among Métis men were particularly elevated for external causes and circulatory, respiratory and digestive system diseases; among Métis women, for circulatory system diseases, cancers, and digestive and respiratory system diseases. Generally, rate differences for Registered Indian men and women were further elevated.

Conclusions

Métis adults had higher mortality rates compared with non-Aboriginal members of the cohort, but lower rates than did Registered Indians.

Keywords

Aboriginal, age-standardized mortality rates, First Nations, indigenous, longitudinal, non-institutional, record linkage, socio-economic.

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First Nations (North American Indians), Métis and Inuit are the three major Aboriginal groups in Canada. Research has consistently shown that First Nations have a much shorter life expectancy than that for Canada as a whole, and are at increased risk for causes of death that occur more frequently at younger ages, such as injuries and suicides.[1-16] The pattern is similar for Inuit.[15,17,18] However, mortality patterns among Métis are largely unknown.[19]

The Métis people of Canada were originally descended from unions between European men and North American Indian women, primarily in Western Canada. The Métis have their own distinct culture and traditions.[20] While there is no single definition of Métis, the term generally includes any person of mixed North American Indian and European ancestry who self-identifies as Métis.[19]

On the 2006 census, individuals who self-identified as Métis represented about one-third (34%) of the total Aboriginal population of Canada.[21] Compared with their population size, Métis have been under-represented in Aboriginal health research.[22,23]

Mortality data for Métis are difficult to generate. Information on the Aboriginal ancestry, identity or status of decedents is not routinely collected on death registrations. Because, until recently, there was no comprehensive national registry of Métis, their mortality cannot be studied directly—as has been done for Registered Indians. And because most Métis people do not live in areas where they constitute a high proportion of the total population, their mortality cannot be studied indirectly with an area-based approach[24]—as has been done for Inuit.[17,25]

The 1991 to 2001 Canadian census mortality follow-up study provides an unprecedented opportunity to examine mortality among Métis. The primary objective of this paper is to fill the data gap with regard to mortality among Métis adults; results for Registered Indians are presented to provide context. The specific objectives are to determine the risk of premature death among Métis and Registered Indians aged 25 or older, to calculate their remaining life expectancy and probability of survival to

age 75, and to identify the causes of death most responsible for excess mortality compared with non-Aboriginal adults.

Methods

Data sources

The Canadian census mortality follow-up study consists of a 15% sample (2,735,152) of the non-institutionalized population aged 25 or older, all of whom were enumerated via the 1991 census long-form questionnaire. This cohort was tracked for mortality from June 4, 1991 to December 31, 2001. Details of the construction and contents of the census mortality database have previously been reported.[26]

Briefly, because the electronic census data files did not contain names, but names were needed to find the corresponding deaths, creation of the census mortality database required two linkages. First, the census file was linked to a nominal list (name) file (abstracted from tax-filer data and then encrypted). Then, the census plus encrypted name file was matched to the Canadian Mortality Database using methods of probabilistic record linkage,[27] an approach similar to that used for other mortality follow-up studies at Statistics Canada.[28] The resulting file contained anonymous information on demographic characteristics, socio-economic status, activity limitations, disability, and for individuals who died during the study period, cause and date of death.

Eligibility

Only people who were enumerated by the 1991 census long-form questionnaire, had attained age 25 by census day (June 4, 1991), and who were usual residents of Canada were eligible to be part of the mortality follow-up study cohort.

Data quality reports found that the 1991 census missed 3.4% of Canadian residents of all ages. Compared with the enumerated population, the missed individuals were more likely to be young, mobile, low-income, of Aboriginal ancestry,[29] or homeless. A total of 78 Indian reserves—representing about 38,000 people—were either not enumerated or incompletely enumerated and so were excluded from the census database[30] and could not be part of the follow-up study cohort. The long-form questionnaire was generally given to 1 in 5 Canadian households. However, all residents of the Indian Reserves that were enumerated, of many remote and northern communities, and of non-institutional collective dwellings received a long-form. Because of the necessity of obtaining encrypted names from tax-filer data, only tax-filers could be followed for mortality.

Analytical techniques

For each cohort member, person-days of follow-up were calculated from the beginning of the study (June 4, 1991) to their date of death or emigration (ascertained from the name file and known for 1991 only), or the end of the study (December 31, 2001). Person-days of follow-up were divided by 365.25 to get person-years at risk.

Age- and sex-specific mortality rates by 5-year age groups (at baseline) were used to calculate age-standardized mortality rates (ASMRs) for subgroups, using the total cohort Aboriginal population structure (person-years at risk), both sexes together, as the standard population. In this case, the Aboriginal population consisted of anyone who indicated a North American Indian, Métis or Inuit ancestry, Registered Indian status, or membership in a North American Indian Band or First Nation. Corresponding 95% confidence intervals for the ASMRs were calculated as described by Carrière and Roos.[31] A similar method was used to calculate confidence intervals for the ASMR rate ratios (RRs) and ASMR rate differences (RDs).

For age-specific analyses, cohort members were categorized by 10-year age group from 25-to-34 to 65-to-74 and 75 or older. The mortality rates within each of these age groups were age-standardized using 5-year age groups. For example, the mortality rate in the 25-to-34 age group was age-standardized using the Aboriginal population (as described in the previous paragraph) age distribution for 25-to-29- and 30-to-34-year-olds. While most analyses used age at baseline (June 4, 1991), life table analyses used age at the beginning of each year of follow-up.

Period life tables for each sex, plus corresponding standard errors and 95% confidence intervals, were calculated according to the method of Chiang.[32] These calculations were made after age was transformed from age at baseline to age at the beginning of each year of follow-up, and deaths and person-years at risk were calculated separately for each year (or partial year) of follow-up. Deaths and person-years at risk were then pooled by age at the beginning of each year of follow-up before calculation of the life tables.

Cox proportional mortality hazard ratios were calculated by sex, first controlling for age (years), and then further controlling for highest level of education (less than high school graduation, high school graduation, postsecondary diploma, university degree), income adequacy quintile (1 to 5), occupation skill level (professional, managerial, skilled/technical/supervisory, semi-skilled, unskilled, no occupation), community size (1 million or more; 500,000 to 999,999; 100,000 to 499,999; 10,000 to 99,999; less than 10,000), and place of birth (Canada or elsewhere). Place of birth was included in the models to reduce the healthy immigrant effect among non-Aboriginal cohort members. Detailed definitions of these variables have been previously provided.[26] Differences in excess mortality (1 minus the hazard ratio) comparing the two models were interpreted as estimates of the effect of the above-mentioned socio-economic variables on the extent of the disparities between Métis and other cohort members, and between Registered Indians and other cohort members.

The underlying cause of death of those who died during the study period had been previously coded to the World Health Organization's *International Classification of Diseases, Ninth Revision* (ICD-9)[33] for deaths occurring in the period 1991 through 1999, and to the *Tenth Revision* (ICD-10)[34] for deaths occurring in 2000 or 2001. For

analyses by cause of death, deaths were categorized according to cause groupings established by the Public Health Agency of Canada[35] and by the European Union Working Group on Socioeconomic Inequalities in Health.[36] Appendix Table A contains the list of ICD codes.

Defining Métis and Registered Indian populations

The Métis population can be defined in several ways from the Census, either using an identity concept or using an ancestry concept.[37] Because the 1991 census did not ask respondents to self-identify as an Aboriginal person (North American Indian, Métis, or Inuit), the ancestry approach was used. Census respondents were asked to which ethnic or cultural group(s) their ancestors belonged.[38] From a list of 15 groups, including Métis, respondents were instructed to check as many as applicable.

Registered Indian status was determined by a direct question: "Is this person a *Registered Indian* as defined by the Indian Act of Canada?" (Yes, No). Registered Indians could also report any ethnic origin, including Métis, and if so, such persons could be classified in both groups for this study. For this analysis, a total of 2,200 cohort members were classified as both Métis and Registered Indians.

Derivation of Métis within the cohort

Within the entire 2.7 million-person cohort of the mortality follow-up study, 19,100 persons indicated some Métis ancestry (Table 1). Of those, 11,800 reported only Métis ancestry or Métis plus other Aboriginal (with or without any other non-Aboriginal ancestry). The remaining 7,300 reported Métis and at least one non-Aboriginal ancestry, but no other Aboriginal ancestry. To simplify terminology, these two groupings will be referred to as "Métis plus other Aboriginal" and "Métis plus non-Aboriginal," respectively. The composition of the two groupings was based on an analysis of 1996 census data that cross-classified ethnic origins by Aboriginal identity (not asked in 1991).[37]

Table 1
Derivation of the "Metis" subset of entire cohort, non-institutional population aged 25 or older at baseline, Canada, 1991

Cohort subset	Total	Men	Women	Estimated Aboriginal identity(c)	Estimated Métis identity(c)
Entire cohort	2,735,200	1,358,400	1,376,800	Less than 1%	Less than 1%
Any Metis ancestry	19,100	9,100	10,000	66%	57%
(a) Métis plus non-Aboriginal	7,300	3,400	3,900	50%	48%
(b) Métis plus other Aboriginal	11,800	5,700	6,100	91%	73%

Notes: Any Metis ancestry includes the following ethnic origin categories: (a) Metis plus non-Aboriginal and no other Aboriginal origins; (b) Metis, Metis plus First Nations, Metis plus Inuit, Metis plus First Nations plus Inuit, Metis plus First Nations plus non-Aboriginal, Metis plus Inuit plus non-Aboriginal, Metis plus First Nations plus Inuit plus non-Aboriginal; for the remainder of this report, this group will be referred to as simply "Metis." (c) based on 1996 census data showing ethnic origins or ancestry cross-classified by Aboriginal identity (First Nations, Inuit, Metis or combinations with or without non-Aboriginal origins).
Source: 1991 to 2001 Canadian census mortality follow-up study, 1996 Census of Canada (Guimond E, 2003).

The categories included in the "Métis plus other Aboriginal" grouping were those with any Métis ancestry for which the highest proportion of the category self-identified as Métis. Altogether, in the 1996 census data, 91% of the "Métis plus other Aboriginal" category self-identified as Aboriginal (73% Métis), and 50% of the "Métis plus non-Aboriginal" category self-identified as Aboriginal (48% Métis).

The socio-demographic characteristics of the entire mortality follow-up study cohort differed from those of the two Métis groupings (data not shown). The characteristics of the "Métis plus other Aboriginal" group were most distinctive, while those of the "Métis plus non-Aboriginal" group were intermediate between the entire cohort and the "Métis plus other Aboriginal" group. Therefore, the only results shown in the remainder of this article are those for the former group. As well, the "Métis plus other Aboriginal" is referred to simply as "Métis."

Results

The 1991 to 2001 Canadian census mortality follow-up study followed about 2.7 million persons, including 11,800 Métis and 56,700 Registered Indians, for 11 years. The latter two groups accounted for 120,920 and 577,380 person-years at risk, and 889 and 4,506 deaths, respectively, during that period (Table 2). Linkage rates to the name file (comparing cohort members to long-form census respondents) were lower

Table 2
Long-form census respondents, cohort members, linkage rate, deaths and person-years at risk, by sex and population group, non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001

Sex and population group	Long-form census respondents	Cohort members	Linkage rate (%)	Number of deaths	Person-years at risk
Both sexes					
Non-Aboriginal	3,392,500	2,624,300	77	253,225	26,483,760
Métis	18,300	11,800	65	889	120,920
Registered Indians	106,300	56,700	53	4,506	577,380
Men					
Non-Aboriginal	1,647,300	1,307,800	79	149,335	13,066,360
Métis	9,300	5,700	62	512	57,960
Registered Indians	52,300	24,600	47	2,377	248,210
Women					
Non-Aboriginal	1,745,200	1,316,500	75	103,890	13,417,400
Métis	9,000	6,100	68	377	62,960
Registered Indians	54,000	32,100	59	2,129	329,180

Notes: Metis defined by ethnic origins as shown in Table 1 (the "Metis plus other Aboriginal" group). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Metis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study.

for Métis (62% for men and 68% for women) than for non-Aboriginal cohort members (79% and 75%), but not as low as rates for Registered Indians (47% and 59%). Based on 1991 deaths that could be identified independently in the Canadian Mortality Database and/or the name file, ascertainment of deaths in the cohort (from 1991 to 2001) was estimated at about 97% overall, and 95% to 96% among persons with any Aboriginal ancestry. Registered Indian status or membership in an Indian Band or First Nation.

A comparison of the demographic and socio-economic characteristics of Métis cohort members with those of

Table 3
Percentage distribution of demographic, socio-economic and geographic characteristics of non-Aboriginal adults, Métis and Registered Indians, by sex, non-institutional population aged 25 or older at baseline, Canada, 1991

	Men			Women		
Characteristic	Non-Aboriginal	Métis	Registered Indians	Non-Aboriginal	Métis	Registered Indians
Number	1,307,800	5,700	24,600	1,316,500	6,100	32,100
	Percentage distribution			Percentage distribution		
Age group						
25 to 34	27	38	41	28	43	44
35 to 44	26	28	28	26	28	28
45 to 54	18	18	16	17	14	15
55 to 64	14	10	9	12	8	8
65 to 74	10	4	5	10	5	4
75 or older	5	2	2	6	2	2
Marital status						
Single (never married)	13	20	22	11	16	16
Common-law	7	19	18	6	17	17
Married	73	51	51	63	48	51
Previously married	7	9	10	19	19	16
Educational attainment						
Less than high school graduation	34	54	60	34	51	56
High school graduation	38	34	32	35	31	28
Postsecondary diploma	13	8	7	19	14	13
University degree	15	4	2	12	4	3
Labour force status						
Employed	73	61	50	59	47	40
Unemployed	6	18	21	5	10	11
Not in labour force	21	21	29	36	43	49
Income adequacy quintile						
Quintile 1 (lowest)	14	29	40	19	36	42
Quintile 2	19	24	26	19	22	25
Quintile 3	21	19	17	20	18	17
Quintile 4	23	17	12	20	14	11
Quintile 5 (highest)	23	11	6	21	9	5
Region						
Atlantic Canada	8	2	5	8	2	5
Quebec	26	8	9	26	7	10
Ontario	37	8	18	37	8	17
Prairies	16	69	41	16	69	42
British Columbia	12	6	21	12	5	20
Territories	1	8	6	< 1	8	6
Community size						
1,000,000 or more	31	6	3	32	5	4
500,000 to 999,999	16	14	4	17	15	5
100,000 to 499,999	15	5	5	16	6	5
10,000 to 99,999	14	15	12	14	16	12
Less than 10,000	23	59	76	21	58	73
Living on reserve						
Yes	< 1	7	73	< 1	8	68
No	100	93	27	100	92	32

Notes: Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study.

all eligible Métis adults in the census population (weighted) revealed very few differences between the two (Appendix Table B); therefore, the sample of Métis was not biased with respect to those characteristics. Results were similar for Registered Indians (Appendix Table C).

The geographic distribution of Métis and Registered Indian cohort members differed from that of all eligible Métis and Registered Indian adults in the census population (weighted). The cohort had an over-representation of Métis and Registered Indians living in communities with less than 10,000 people, on reserves, or in the territories. These differences reflected the fact that all residents of participating Indian reserves and many remote and northern communities were enumerated using a long-form questionnaire (rather than the 1 in 5 ratio for most of the household population), and thus, were eligible for the cohort.

Characteristics of Métis and Registered Indian cohort members

Compared with non-Aboriginal members of the cohort, Métis were younger and less likely to be legally married, and more likely to be in a common-law relationship (Table 3). They were less likely to have completed high school and to be employed, and more likely to be in the lowest income quintile. Nearly 70% lived in Manitoba, Saskatchewan or Alberta (Prairies), and almost 60% lived in rural areas or communities with less than 10,000 population. Fewer than 10% lived on an Indian Reserve.

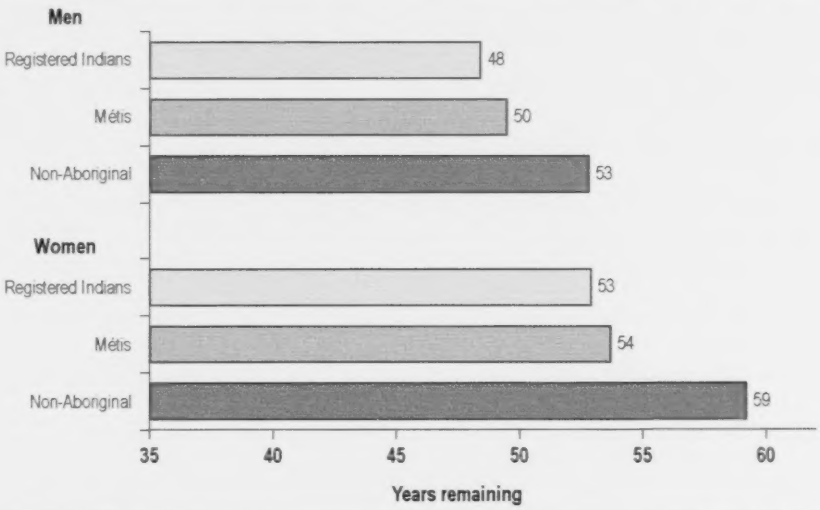
Registered Indian cohort members were similar to Métis with respect to age structure and marital status. Compared with Métis and non-Aboriginal cohort members, Registered Indians were less likely to be employed, and more likely to be in the lowest income quintile and to have lower educational attainment. In part because of over-sampling on reserves, about 70% of Registered Indian cohort members were living on a reserve at time of the census.

Life expectancy

For Métis adults of both sexes, remaining life expectancy at age 25 was substantially shorter than that of non-Aboriginal cohort members, but longer than that of Registered Indians.

At age 25, a Métis man could expect to live an additional 49.5 years, compared with 52.8 years for non-Aboriginal men in the cohort, a difference of 3.3 years (Figure 1, Table 4). While Métis women had longer remaining life expectancy than Métis men, the gap between Métis women and non-Aboriginal women was wider. A 25-year old Métis woman could expect to live an additional 53.7 years, compared with 59.2 years for non-

Figure 1
Life expectancy at age 25 of Registered Indians, Métis and non-Aboriginal cohort members, by sex, non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001



Note: Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study.

Table 4
Life expectancy at age 25 and probability of survival from age 25 to 75 for Registered Indian, Métis and non-Aboriginal cohort members, non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001

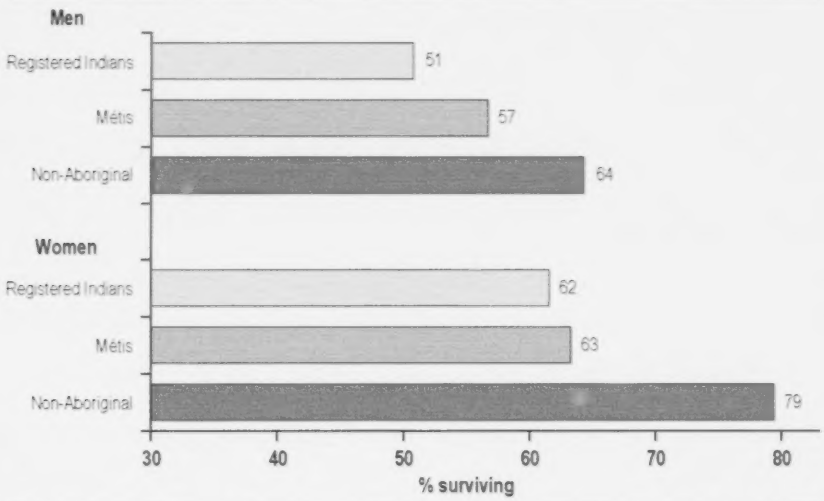
	Men			Women		
		95% confidence interval			95% confidence interval	
Sex and category		from	to		from	to
Life expectancy at age 25	Years			Years		
Non-Aboriginal	52.8	52.7	52.8	59.2	59.1	59.2
Métis	49.5	48.4	50.5	53.7	52.5	54.8
Registered Indians	48.4	47.9	49.0	52.9	52.4	53.4
Probability of survival to age 75	%			%		
Non-Aboriginal	64.3	64.1	64.5	79.4	79.2	79.6
Métis	56.7	52.7	60.6	63.3	59.1	67.5
Registered Indians	50.7	48.8	52.6	61.5	59.7	63.3

Note: Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study.

Aboriginal women, a difference of 5.5 years.

For both sexes, life expectancy at age 25 was estimated to be about one year longer for Métis than for Registered Indians (49.5 versus 48.4 years for men; 53.7 versus 52.9 years for women).

Figure 2
Probability of survival from age 25 to 75 of Registered Indians, Métis and non-Aboriginal cohort members, by sex, non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001



Note: Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study.

Probability of survival to age 75

About 57% of Métis men were expected to survive to at least age 75 (conditional on survival to age 25), compared with 64% of non-Aboriginal men, a 7-percentage-point difference (Figure 2, Table 4). For Métis women, the corresponding figures were 63% and 79%, a 16-percentage-point difference.

The point estimates for survival to age 75 were lower for Registered Indians. About 51% of Registered Indian men were expected to survive to age 75, compared with 64% of non-Aboriginal men, a 13-percentage-point difference. For Registered Indian women, the corresponding figures were 62% and 79%, an 18-percentage-point difference.

Age-specific and age-standardized mortality rates

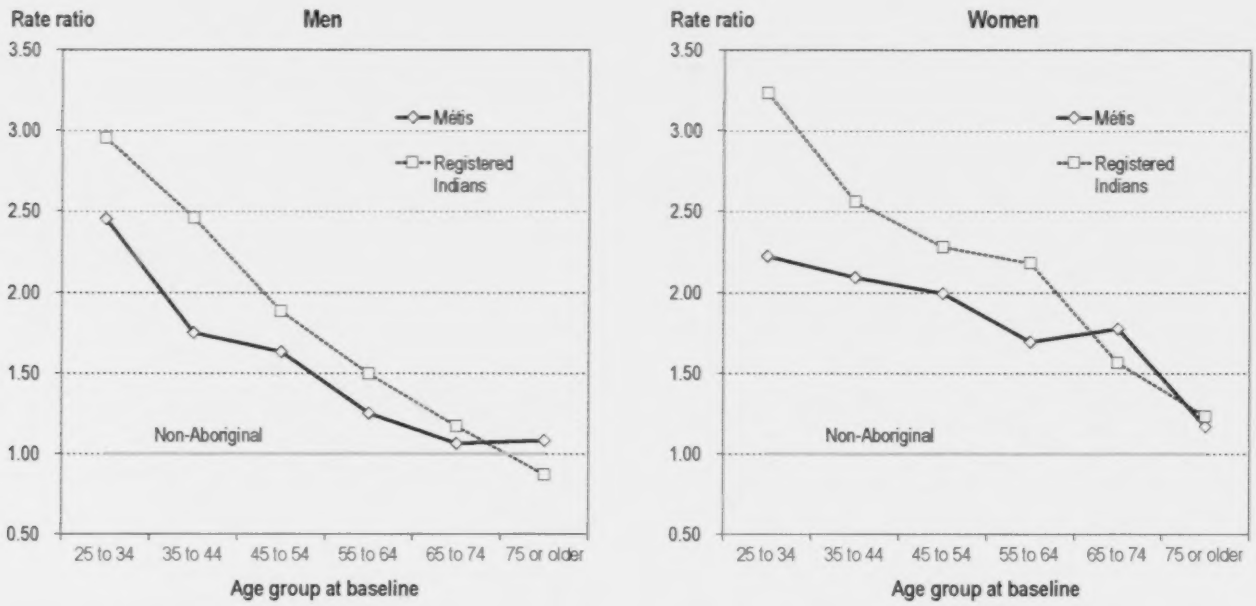
Table 5 shows age-standardized mortality rates (ASMR) per 100,000 person-years at risk for Métis, Registered Indians and non-Aboriginal cohort members, as well as ASMR rate ratios (RRs) for Métis and Registered Indians, compared with non-Aboriginal cohort

Table 5
Deaths, age-standardized mortality rates (ASMRs) per 100,000 person-years at risk, and rate ratios for Métis and Registered Indians compared with non-Aboriginal cohort members, by sex and age group, non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001

Sex and age group at baseline	Métis							Registered Indians							Non-Aboriginal			
			95% confidence interval							95% confidence interval							95% confidence interval	
	Deaths	ASMR	from	to	Rate ratio	from	to	Deaths	ASMR	from	to	Rate ratio	from	to	Deaths	ASMR	from	to
Men																		
Total 25 or older	512	781.3	715.6	853.0	1.38	1.26	1.51	2,377	886.5	851.5	923.1	1.56	1.50	1.63	149,335	566.7	563.4	569.9
25 to 34	58	257.7	199.2	333.3	2.45	1.89	3.18	327	310.2	278.3	345.7	2.95	2.64	3.30	3,922	105.1	101.9	108.5
35 to 44	60	362.1	281.2	466.4	1.75	1.36	2.25	357	508.9	458.8	564.5	2.46	2.21	2.73	7,515	207.3	202.6	212.0
45 to 54	96	935.9	766.2	1,143.2	1.63	1.34	2.00	429	1,077.0	979.8	1,183.9	1.88	1.71	2.07	14,045	573.0	563.6	582.6
55 to 64	114	2,033.5	1,692.1	2,443.6	1.25	1.04	1.51	489	2,411.1	2,206.6	2,634.6	1.49	1.36	1.63	30,798	1,621.3	1,603.0	1,639.7
65 to 74	88	4,480.7	3,635.9	5,521.9	1.06	0.86	1.31	466	4,951.0	4,521.1	5,421.9	1.17	1.07	1.28	49,499	4,227.7	4,190.7	4,265.2
75 or older	96	11,524.9	9,398.5	14,132.4	1.08	0.88	1.33	309	9,319.6	8,334.0	10,421.7	0.87	0.78	0.98	43,556	10,651.5	10,551.4	10,752.7
Women																		
Total 25 or older	377	549.0	495.6	608.2	1.72	1.55	1.91	2,129	623.7	597.7	650.8	1.96	1.87	2.04	103,890	318.9	316.5	321.2
25 to 34	32	115.3	81.5	163.0	2.22	1.56	3.14	248	168.3	148.6	190.6	3.23	2.84	3.69	2,081	52.0	49.8	54.3
35 to 44	50	274.3	207.9	361.9	2.09	1.58	2.76	307	335.3	299.8	375.0	2.56	2.28	2.87	4,885	131.2	127.5	134.9
45 to 54	61	667.2	519.1	857.5	1.99	1.54	2.55	380	766.0	692.7	847.1	2.28	2.06	2.53	7,666	336.1	328.6	343.7
55 to 64	67	1,427.8	1,123.1	1,815.2	1.69	1.33	2.15	448	1,837.5	1,674.9	2,015.8	2.18	1.98	2.39	14,025	844.0	830.0	858.3
65 to 74	99	3,952.4	3,238.0	4,824.5	1.77	1.45	2.17	405	3,478.8	3,155.8	3,834.9	1.56	1.42	1.72	29,208	2,227.9	2,202.4	2,253.7
75 or older	68	7,725.2	6,038.4	9,883.1	1.17	0.92	1.50	341	8,102.4	7,286.2	9,010.1	1.23	1.10	1.37	46,025	6,593.0	6,532.7	6,653.8

Notes: Reference population (person-years at risk) for age standardization was taken from the Aboriginal age distribution (5-year age groups). Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study.

Figure 3
Age-specific mortality rate ratios comparing Métis and Registered Indians with non-Aboriginal cohort members, by sex and age group, non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001



Note: Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study

members. Age-standardized mortality rates were significantly higher for Métis men (RR=1.38) and women (RR=1.72), and higher still for Registered Indian men (RR=1.56) and women (RR=1.96). For Métis and Registered Indians of both sexes, rate ratios were highest in the younger age groups and diminished with advancing age (Figure 3).

Causes of death

Among Métis men, the most common causes of death were circulatory system diseases (32% of the total ASMR), followed by all cancers (23%) and external causes such as suicides and motor vehicle accidents (18%)—a ranking similar to that of non-Aboriginal men (Appendix Table D). For Métis women, the most common causes of death were all cancers (33%), circulatory system diseases (29%), respiratory system diseases (7%), external causes (6%) and digestive system diseases (6%)—the same ranking as for non-Aboriginal cohort women (Appendix Table E).

For Registered Indians, the ranking of causes of death was somewhat different. Among Registered Indian men, the most common causes were circulatory system diseases (28%), external causes (21%) and all cancers (18%). For Registered Indian women, the most common causes were circulatory system diseases (26%), all cancers (25%) and external causes (11%).

Tables 6 and 7 show age-standardized rate ratios and rate differences by major cause of death groupings for men and for women, respectively. (Appendix Tables D and E show the corresponding numbers of deaths.) Rate ratios for Métis men were elevated for most causes, particularly external causes (RR=2.65) such as drowning (RR=6.94), homicide (RR=4.76), poisoning (RR=3.52) and motor vehicle accidents (RR=3.22), and deaths from infectious (RR=1.74), endocrine (RR=1.86) and digestive (RR=1.93) system diseases. Rate ratios for Métis women were also elevated, especially for poisoning (RR=6.71), infectious diseases (RR=2.99), digestive system diseases (RR=3.01), mental disorders (RR=2.90), and genitourinary (RR=2.97) and endocrine (RR=2.66) system diseases.

Rate ratios for Registered Indian men were even higher for most causes of death, notably external causes (RR=3.52), mental disorders (RR=3.30), endocrine (RR=3.18) and digestive system (RR=2.76) diseases. Rate ratios for Registered Indian women were especially high for infectious (RR=5.34), endocrine (RR=5.00) and digestive (RR=4.44) system diseases and external causes (RR=3.66).

Rate differences (RDs) for Métis men compared with non-Aboriginal men were highest for deaths from external causes (RD=89) and circulatory system diseases (RD=55), which together accounted for 67% of the total RD. Rate differences

Table 6
Rate ratios and rate differences per 100,000 person-years at risk for Métis and Registered Indians compared with non-Aboriginal cohort members, by cause of death, male non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001

	Métis						Registered Indians					
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
Cause of death	Rate ratio	from	to	Rate difference	from	to	Rate ratio	from	to	Rate difference	from	to
All cause	**1.38**	**1.26**	**1.51**	**214.6**	**145.9**	**283.3**	**1.56**	**1.50**	**1.63**	**319.9**	**284.0**	**355.8**
Infectious diseases	1.74	1.02	2.95	9.8	-2.4	22.0	1.29	0.95	1.74	3.8	-1.3	8.9
Cancer	0.94	0.78	1.12	-11.7	-43.8	20.3	0.87	0.79	0.95	-25.1	-40.3	-9.9
Pancreas	1.02	0.46	2.29	0.2	-7.3	7.7	0.72	0.45	1.14	-2.6	-5.6	0.5
Prostate	1.04	0.58	1.85	0.6	-9.9	11.1	0.91	0.68	1.22	-1.6	-6.2	3.1
Urinary system	1.24	0.62	2.49	2.3	-6.2	10.9	1.38	1.00	1.91	3.7	-0.7	8.2
Trachea, bronchus and lung	1.21	0.91	1.61	11.8	-7.8	31.4	0.87	0.74	1.03	-7.2	-15.5	1.2
Lymp tissue and leukemia	0.61	0.29	1.30	-7.3	-15.9	1.4	0.72	0.52	1.00	-5.2	-9.7	-0.8
Esophagus and stomach	0.82	0.39	1.74	-2.2	-10.1	5.6	1.08	0.78	1.50	1.0	-3.4	5.5
Intestine and rectum	0.73	0.40	1.32	-6.3	-16.4	3.8	0.79	0.60	1.04	-4.8	-9.9	0.2
Other cancer	0.74	0.48	1.15	-10.2	-23.1	2.6	0.77	0.62	0.95	-9.1	-15.7	-2.5
Endocrine system diseases	1.86	1.22	2.83	14.5	1.3	27.8	3.18	2.69	3.75	36.9	28.2	45.7
Diabetes mellitus	2.02	1.28	3.18	13.6	1.4	25.8	3.48	2.92	4.16	33.1	25.0	41.2
Other endocrine	1.25	0.40	3.92	0.9	-4.3	6.1	2.05	1.31	3.21	3.8	0.5	7.1
Mental disorders	1.74	0.89	3.38	6.0	-3.4	15.4	3.30	2.60	4.19	18.7	12.4	25.0
Nervous system diseases	1.16	0.62	2.17	2.1	-7.4	11.5	0.96	0.68	1.35	-0.5	-4.8	3.7
Circulatory system diseases	1.29	1.11	1.50	55.4	17.6	93.2	1.28	1.18	1.38	53.2	34.6	71.9
Ischaemic heart disease	1.35	1.12	1.63	43.6	12.1	75.0	1.26	1.14	1.38	31.8	17.0	46.6
Cerebrovascular diseases	1.28	0.86	1.90	7.8	-6.4	22.1	1.26	1.03	1.53	7.2	0.2	14.3
Heart failure	1.21	0.57	2.53	1.6	-5.3	8.5	1.88	1.38	2.56	6.7	2.3	11.2
Other circulatory	1.07	0.73	1.58	2.4	-11.5	16.3	1.22	1.01	1.48	7.5	-0.2	15.1
Respiratory system diseases	1.46	1.07	2.01	18.4	0.1	36.8	1.63	1.41	1.89	25.0	15.5	34.5
Pneumonia	2.50	1.58	3.96	17.3	4.1	30.6	2.29	1.82	2.89	14.9	8.9	21.0
Bronchitis, emphysema and asthma	0.93	0.56	1.55	-1.5	-11.9	9.0	1.05	0.82	1.34	1.0	-4.6	6.6
Other respiratory	1.42	0.63	3.17	2.6	-4.6	9.8	2.45	1.81	3.32	9.1	4.5	13.7
Digestive system diseases	1.93	1.29	2.88	18.6	3.2	34.1	2.76	2.34	3.25	35.3	26.3	44.2
Cirrhosis of liver	1.66	0.86	3.21	5.6	-3.6	14.8	3.05	2.38	3.90	17.3	11.1	23.4
Other digestive	2.12	1.28	3.52	13.1	0.7	25.5	2.55	2.04	3.18	18.0	11.5	24.4
Genitourinary system diseases	1.50	0.75	3.02	3.9	-4.2	11.9	2.16	1.60	2.90	8.9	4.0	13.8
Musculoskeletal system diseases	2.50	0.80	7.79	2.4	-2.1	6.9	2.34	1.25	4.40	2.1	-0.2	4.5
Ill-defined conditions	1.24	0.55	2.80	2.0	-6.3	10.3	3.59	2.85	4.53	21.5	14.8	28.2
External causes	2.65	2.13	3.31	89.0	57.8	120.3	3.52	3.20	3.86	135.6	118.3	152.8
Fall	1.84	0.82	4.12	4.4	-3.4	12.2	2.15	1.50	3.10	6.1	2.0	10.1
Drowning	6.94	3.42	14.11	12.1	2.3	22.0	10.87	8.09	14.61	20.2	14.3	26.1
Suicide	1.60	1.03	2.50	12.9	-2.3	28.2	1.66	1.34	2.06	14.3	6.7	21.8
Homicide	4.76	1.77	12.86	6.1	-1.5	13.6	7.79	5.31	11.43	11.0	6.5	15.4
Poisoning	3.52	1.57	7.93	7.9	-1.0	16.8	4.22	2.95	6.04	10.1	5.6	14.7
Motor vehicle accident	3.22	2.08	4.97	25.6	9.6	41.6	4.43	3.68	5.32	39.6	30.6	48.6
Other external	3.28	2.02	5.32	19.9	6.1	33.7	4.93	4.05	6.02	34.4	26.2	42.6
Unknown/Other	2.09	0.86	5.11	4.2	-3.0	11.4	2.19	1.44	3.33	4.6	1.1	8.1
Smoking-related	1.14	0.90	1.43	12.4	-11.5	36.3	0.98	0.87	1.12	-1.4	-12.6	9.8
Alcohol-related	3.23	2.05	5.10	20.3	6.9	33.7	5.91	4.97	7.04	44.8	35.8	53.7
Amenable to medical intervention (younger than 75)	1.76	1.29	2.41	27.2	7.7	46.7	1.71	1.46	2.00	25.4	15.9	34.9

Notes: Reference population (person-years at risk) for age standardization was taken from the Aboriginal age distribution (5-year age groups). Rate ratios and rate differences were calculated by comparing the age-standardized mortality rates for Métis and Registered Indians to those for the entire cohort. Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study.

Table 7
Rate ratios and rate differences per 100,000 person-years at risk for Métis and Registered Indians compared with non-Aboriginal cohort members, by cause of death, female non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001

	Métis						Registered Indians					
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
Cause of death	Rate ratio	from	to	Rate difference	from	to	Rate ratio	from	to	Rate difference	from	to
All cause	**1.72**	**1.55**	**1.91**	**230.2**	**173.9**	**286.4**	**1.96**	**1.87**	**2.04**	**304.8**	**278.2**	**331.5**
Infectious diseases	2.99	1.41	6.37	6.8	-0.9	14.5	5.34	4.11	6.94	14.9	10.3	19.4
Cancer	1.34	1.12	1.61	46.1	13.8	78.4	1.17	1.07	1.27	22.3	8.9	35.8
Pancreas	1.46	0.69	3.10	2.9	-4.0	9.8	1.14	0.77	1.70	0.9	-1.9	3.7
Breast	0.74	0.44	1.26	-7.4	-18.8	3.9	0.86	0.69	1.07	-4.0	-9.4	1.5
Urinary system	1.87	0.76	4.60	2.9	-2.7	8.4	1.31	0.78	2.18	1.0	-1.2	3.2
Trachea, bronchus and lung	1.69	1.20	2.39	20.1	3.2	36.9	1.04	0.86	1.27	1.2	-4.7	7.1
Lymp tissue and leukemia	1.22	0.63	2.35	2.3	-6.3	11.0	0.88	0.63	1.25	-1.3	-4.6	2.1
Esophagus and stomach	1.66	0.69	4.00	3.0	-3.7	9.8	1.14	0.71	1.81	0.6	-1.8	3.1
Intestine and rectum	1.30	0.75	2.25	4.5	-6.1	15.0	1.53	1.22	1.91	7.8	2.7	12.9
Uterus, ovary and adnexa	1.94	1.18	3.17	12.2	-0.2	24.7	1.46	1.13	1.87	6.0	1.3	10.7
Other cancer	1.22	0.77	1.92	5.0	-7.7	17.6	1.43	1.18	1.72	9.7	3.6	15.8
Endocrine system diseases	2.66	1.68	4.20	16.4	4.4	28.4	5.00	4.27	5.85	39.6	32.1	47.1
Mental disorders	2.90	1.55	5.40	10.1	0.5	19.6	2.63	1.96	3.51	8.6	4.6	12.6
Nervous system diseases	1.55	0.80	3.00	4.8	-4.1	13.6	0.85	0.57	1.27	-1.3	-4.2	1.7
Circulatory system diseases	1.71	1.42	2.06	67.0	37.0	97.0	1.74	1.60	1.89	69.5	56.0	83.0
Ischaemic heart disease	1.66	1.27	2.17	32.2	10.7	53.7	1.53	1.36	1.73	26.0	16.9	35.1
Cerebrovascular diseases	1.61	1.08	2.40	13.1	-0.6	26.9	1.91	1.62	2.26	19.5	12.7	26.3
Heart failure	1.66	0.74	3.72	3.2	-3.3	9.6	2.61	1.95	3.50	7.8	4.1	11.4
Other circulatory	1.98	1.35	2.90	18.5	4.2	32.8	1.85	1.55	2.22	16.2	9.9	22.5
Respiratory system diseases	2.00	1.37	2.93	19.7	4.7	34.7	2.60	2.24	3.02	31.5	24.0	39.1
Pneumonia	1.62	0.77	3.43	3.8	-3.7	11.4	3.12	2.45	3.99	13.1	8.5	17.8
Bronchitis, emphysema and asthma	2.03	1.19	3.44	10.2	-0.4	20.9	1.69	1.31	2.19	6.9	2.6	11.2
Other respiratory	2.58	1.16	5.76	5.7	-1.8	13.1	4.19	3.17	5.54	11.5	7.4	15.6
Digestive system diseases	3.01	2.00	4.52	22.9	9.0	36.8	4.44	3.80	5.18	39.2	31.6	46.8
Cirrhosis of liver	4.97	2.73	9.06	13.4	3.4	23.3	7.45	5.92	9.38	21.7	16.3	27.1
Other digestive	2.19	1.26	3.81	9.6	-0.2	19.3	3.18	2.56	3.94	17.5	12.1	22.9
Genitourinary system diseases	2.97	1.43	6.18	8.7	-0.9	18.4	3.19	2.40	4.25	9.7	5.8	13.7
Musculoskeletal system diseases	1.99	0.64	6.20	2.3	-2.9	7.6	3.38	2.28	5.02	5.5	2.5	8.6
Ill-defined conditions	2.18	0.97	4.92	4.8	-2.3	11.9	3.96	2.99	5.24	11.9	7.6	16.2
External causes	1.89	1.24	2.88	16.5	1.8	31.1	3.66	3.19	4.19	49.2	40.3	58.1
Suicide	0.85	0.27	2.64	-0.9	-6.3	4.6	1.86	1.32	2.61	4.9	1.4	8.4
Poisoning	6.71	2.75	16.36	6.8	-0.2	13.8	8.62	5.93	12.53	9.1	5.6	12.5
Motor vehicle accident	2.37	1.12	4.99	6.5	-1.8	14.8	4.62	3.61	5.90	17.1	12.0	22.1
Other external	1.59	0.76	3.35	4.1	-4.1	12.2	3.63	2.91	4.53	18.2	12.8	23.6
Unknown/Other	2.30	0.94	5.61	4.1	-2.4	10.6	2.29	1.54	3.43	4.1	1.2	7.0
Smoking-related	1.75	1.32	2.31	31.6	11.0	52.2	1.17	1.00	1.36	7.0	-0.5	14.5
Alcohol-related	6.22	3.42	11.32	14.8	4.4	25.3	10.06	8.05	12.56	25.7	19.9	31.5
Amenable to medical intervention (younger than 75)	1.83	1.40	2.41	37.5	15.1	60.0	2.06	1.84	2.31	47.8	37.4	58.3

Notes: Reference population (person-years at risk) for age standardization was taken from the Aboriginal age distribution (5-year age groups). Rate ratios and rate differences were calculated by comparing the age-standardized mortality rates for Métis and Registered Indians to those for the entire cohort. Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.

Source: 1991 to 2001 Canadian census mortality follow-up study.

for Métis women compared with non-Aboriginal women were highest for deaths from circulatory system diseases (RD=67) and cancers (RD=46), accounting for 49% of the total rate difference.

Rate differences for Registered Indian men compared with non-Aboriginal men were highest for deaths from external causes (RD=136) and circulatory system diseases (RD=53), which together accounted for 59% of the total rate difference. Rate differences for Registered Indian women were highest for circulatory system diseases (RD=70) and external causes (RD=49), accounting for 39% of the total rate difference.

Deaths were also categorized as smoking-related, alcohol-related or amenable to medical intervention (for example, deaths before age 75 from breast and cervical cancer, infectious diseases, cerebrovascular disease, pneumonia or influenza) as defined by the European Union Working Group on Socioeconomic Inequalities in Health.[36] Rate ratios for smoking-related deaths were not significantly elevated for Métis men or for Registered Indian men, compared with non-Aboriginal men (Table 6). But they were significantly elevated for Métis (RR=1.75) and Registered Indian (RR=1.17) women (Table 7). Rate ratios for alcohol-related deaths were significantly higher among Métis and Registered Indians of both sexes. Rates of premature death (before age 75) considered amenable to medical intervention were also significantly higher for Métis and Registered Indians of both sexes.

Hazard ratios controlling for socio-economic variables

Age-adjusted all-cause mortality hazard ratios comparing Métis and Registered Indians to non-Aboriginal cohort members are shown in Appendix Tables F and G. Both Métis men and women had elevated hazard ratios (1.34 and 1.71, respectively). Controlling for income adequacy, educational attainment, occupation skill level, community size and immigration reduced the hazard ratios substantially (to 1.11 and 1.51, respectively), which suggests that 68% and 28% of the differences in hazards were explained by these socio-economic variables. Age-adjusted hazard ratios for Registered Indian men and women of 1.50 and 1.93, respectively, were reduced to 1.19 and 1.66 when controlling for the socio-economic variables, which suggests that 62% and 29% of the differences were attributable to those variables.

Comparative perspective

In 1996, the mid-point of the follow-up period, remaining life expectancy at age 25 for Métis men was about what it had been for all men in Canada in 1986 (a 10-year lag) (Appendix Table H). For Métis women, remaining life expectancy at age 25 in 1996 was about what it had been for all women in 1973 (a 23-year lag).

For Registered Indian men aged 25 in 1996, remaining life expectancy was about what it had been for all men in Canada in 1979 (a 17-year lag), and for Registered Indian women, about what it had been for all women in Canada in 1968 (a 28-year lag).

Discussion

This is the first in-depth study to examine mortality patterns for a large sample of Métis adults across Canada. Métis and Registered Indians in this cohort had higher mortality rates, shorter life expectancy, and lower probability of survival to age 75, compared with the non-Aboriginal cohort members. This pattern of higher mortality is consistent with that previously described for First Nations in Canada.[3-5,15] Elevated rates of premature mortality (dying before age 75) among Aboriginal people have also been reported in other studies.[5,10]

Mortality rate ratios were highest in the younger age groups and diminished with advancing age—also noted in earlier studies.[1,3,10] Part of this can be explained by the very high death rates from external causes (such as suicides and motor vehicle accidents) among Aboriginal youth and young adults.[3,4,10]

Differentials in mortality varied by cause of death. For some causes, Métis and Registered Indians had much higher death rates, while for others such as cancer, death rates were either similar to or only slightly elevated compared with the non-Aboriginal members of the cohort.

Rate ratios for Métis and Registered Indian men were highest for deaths related to endocrine and digestive system diseases and external causes such as motor vehicle accidents, poisoning, drowning and homicide. Earlier studies have found these types of deaths to be more common among First Nations[3,4,7,8,18] and to represent a major component of premature mortality.[10] The higher rate ratios for deaths from endocrine system diseases likely reflect the higher prevalence of diabetes in the Aboriginal population.[3,19,39-42]

Rate ratios for Métis and Registered Indian women were especially elevated for mental disorders and endocrine, digestive and genitourinary system diseases. For Métis women, rate ratios for external causes, although elevated, were less pronounced than for Métis men. For Registered Indian men and women, rate ratios for external causes were similarly elevated. Compared with non-Aboriginal cohort women, Métis and Registered Indian women had elevated rate ratios for all cancers combined and for most specific cancer sites (with the notable exception of breast cancer). These results differ from previous research on cancer mortality that tended to show excess mortality only for cancer of the cervix,[13,44] gallbladder[6,14] and kidney.[45]

Métis and Registered Indians, especially women, had particularly elevated rates for alcohol-related deaths. These results for Registered Indians are consistent with previous research.[2,4,46] age-standardized mortality rates for premature deaths (before age 75) that are amenable to medical care were elevated for Métis and Registered Indians, accounting for nearly one in five excess premature deaths for Métis men and for Registered Indians of both sexes, and

What is already known on this subject?

- Aboriginal peoples in Canada—First Nations, Métis and Inuit—are a young, diverse and growing population. However, in many databases, Aboriginal peoples cannot be identified, and consequently, basic health information that is routinely available for the general population is not readily available for Aboriginal peoples.
- Before this study, little was known about the mortality of Métis in Canada, although First Nations and Inuit have been shown to have high mortality rates, compared with the rest of the Canadian population.

What does this study add?

- Mortality rates for Métis were much higher than those for non-Aboriginal residents of Canada, especially for women.
- Rates were particularly elevated among Métis women for circulatory, digestive and respiratory system diseases; among Métis men, for external causes and circulatory, respiratory and digestive system diseases.
- Mortality rates among Registered Indians were higher than among Métis, although the causes for which the rates were particularly elevated were similar.
- Among Métis and Registered Indians, socio-economic indicators such as income, education and occupation explained roughly two-thirds of the excess mortality for men, and nearly 30% of that for women.

nearly one in ten excess premature deaths for Métis women.

Rate differences provide a different perspective by considering how rare or common a cause of death is, whereas rate ratios focus on relative risk. Rate differences were particularly high for deaths from circulatory system diseases and external causes, which together accounted for 67% of all excess mortality (the total rate difference) among Métis men, and about 59% among Registered Indian men.

Rate differences among Métis women were particularly high for circulatory system diseases and cancers, which together accounted for 49% of the excess mortality. Among Registered Indian women, 52% of excess mortality was attributable to circulatory system diseases, endocrine system diseases, and external causes of death.

Hazard regression analysis showed that substantial shares of these disparities in mortality (roughly two-thirds for Métis and Registered Indian men, and nearly 30% for Métis and Registered Indian women) were associated with their lower levels of income, education, occupation skill, and urban residence, compared with non-Aboriginal cohort members.

Limitations

To be eligible for inclusion in the Canadian census mortality follow-up study, a person had to have been enumerated by the 1991 census long form and been a tax-filer for the year 1990 or 1991. Under section 87 of the *Indian Act*, Registered Indians are entitled to a tax exemption for income earned or considered to be earned on a reserve.[47]

As well as those who did not file a tax return, persons in long-term care facilities, senior's residences or prisons could not be included in the mortality follow-up study.

Compared with life tables for all Canada (1995 to 1997), the entire cohort had 1 year longer life expectancy for men and 2 years longer life expectancy at age 25 for women.

Linkage rates were lower among Métis (62% for Métis men and 68% for Métis women), compared with non-Aboriginal adults (79% and 75%, respectively). However, the socio-economic profile of Métis cohort members was similar to that of all Métis long-form census respondents, suggesting that there was likely little or no linkage bias. Linkage rates for Registered Indians were even lower (47% for men and 59% for women), but again, analysis revealed that the demographic and socio-economic characteristics of those who were and were not linked were similar.

Ascertainment of deaths was estimated to be slightly lower (95% to 96%) among Aboriginal persons, compared with the cohort as a whole (97%). This would result in a slight downward bias in mortality rates calculated for Métis and Registered Indians, so the true extent of the disparities compared with non-Aboriginal cohort members could be slightly larger than indicated in this study.

Because questions about Aboriginal identity were not asked on the 1991 census, Métis were defined by ethnic origin (ancestry). However, based on 1996 census data cross-classified by Aboriginal identity, an estimated 73% of persons classified as Métis in this study would likely have identified as Métis. Nevertheless, the classification undoubtedly excluded many persons who might have identified as Métis, without indicating Métis ancestry (impossible to ascertain in 1991), or who reported categories of mixed Aboriginal and non-Aboriginal ancestry where half or less the population were expected to identify as Métis (and whose inclusion in the cohort would have biased the results). From 1996 to 2006, the self-identified Métis population increased by 91%.[21,37] However, the Métis in this study were identified based on Métis ancestry reported in 1991; they were not necessarily the same as persons who self-identified as Métis in 2006.

Conclusion

The 1991 to 2001 census mortality follow-up study has made it possible to fill a data gap by examining mortality

among the Métis people of Canada. Métis and Registered Indian adults had higher mortality rates, compared with non-Aboriginal adults. At age 25, the life expectancy of Métis men was about three years shorter than that of non-Aboriginal men in the study cohort, and that of Métis women, about five years shorter. Life expectancy for Registered Indian men and women was about four and six years shorter, respectively. Mortality disparities between Métis and Registered Indians and non-Aboriginal cohort members varied by cause of death. Many of these deaths were potentially preventable (for example, intentional and unintentional injuries) or amenable to medical care or modification of behavioural risk factors such as smoking or alcohol abuse. Furthermore, a substantial proportion of these disparities (roughly two-thirds for Métis and Registered Indian men, and nearly 30% for Métis and Registered Indian women) were explained by socio-economic differences.

These results provide baseline data about mortality patterns among Métis and Registered Indian adults that can be used to begin (for Métis) or continue (for Registered Indians) tracking changes over time. ■

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Appendix

Table A
ICD-9 and ICD-10 codes for selected causes of death

Category	ICD-9 codes	ICD-10 codes
Infectious diseases	001-139	A00-B99, U04
Cancer	140-239	C00-D48
Pancreas	157	C25
Breast	174-175	C50
Prostate	185	C61
Urinary system	188-189	C64-C68
Trachea, bronchus and lung	162	C33-C34
Lymp tissue and leukemia	200-208	C81-C96
Esophagus and stomach	150-151	C15-C16
Intestine and rectum	152-154, 159.0	C17-C21, C26.0
Uterus, ovary and adnexa	179-183	C53-C56, C57.0-C57.4, C58
Endocrine system diseases	240-279	E00-E99
Diabetes mellitus	250	E10-E14
Mental disorders	290-319	F00-F99
Nervous system diseases	320-389	G00-G99, H00-H95
Circulatory system diseases	390-459	I00-I99
Ischemic heart disease	410-414, 429.2	I20-25, I51.6
Cerebrovascular diseases	430-438	I60-I69
Heart failure	428	I50
Respiratory system diseases	460-519	J00-J99
Pneumonia	480-486	J12-J18
Bronchitis, emphyesema and asthma	490-493, 496	J40-J46
Digestive system diseases	520-579	K00-K93
Cirrhosis of liver	571	K70, K73-K74
Genitourinary system diseases	580-629	N00-N99
Musculoskeletal system diseases	710-739	M00-M99
Ill-defined conditions	780-799	R00-R99
External causes	800-999	V01-Y98
Fall	880-888, 929.3	W00-W19, X59
Drowning	830, 832, 910	W65-W74, V90, V92
Suicide	950-959	X60-X84, Y87.0
Homicide	960-969	X85-X99, Y87.1
Poisoning	850-869	X40-X49
Motor vehicle accident	810-825, 929.0	V02-V04, V09.0, V09.2, V12-V14, V19.0-V19.2, V19.4-V19.6, V20-V79, V80.3-V80.5, V81.0-V81.1, V82.0-V82.1, V83-V86, V87.0-V87.8, V88.0-V88.8, V89.0, V89.2 Y85.0
Smoking-related	140-150, 161-163, 165, 490-494, 496	C00-C15, C30-C34, C39, J40-J44, J47
Alcohol-related	291, 303, 305.0, 425.5, 571.0-571.3, 577.0-577.1, 860	F10, I42.6, K70, K85, K86.0, X45
Amenable to medical intervention (younger than 75)	001-139, 174-175, 180, 201, 204-208, 401-405, 430-438, 480-487, 531-534, 540-543, 550-553, 560, 574-576, 630-677	A00-B99, U04, C50, C53, C81, C91-C95, I10-I15, I60-I69, J10-J18, K25-K28, K35-K38, K40-K46, K56, K80-K83, 000-099

Table B
Demographic, socio-economic and geographic characteristics of in-scope (eligible) Métis census respondents, compared with Métis cohort members, by sex, non-institutional population aged 25 or older at baseline, 1991

	Men					Women				
	In-scope[1]		Cohort			In-scope[1]		Cohort		
Characteristic	Number	%	Number	%	Ratio	Number	%	Number	%	Ratio
Total	**25,300**	**100**	**5,700**	**100**	**1.00**	**26,600**	**100**	**6,100**	**100**	**1.00**
Age group										
25 to 34	9,400	37	2,200	38	1.02	10,400	39	2,600	43	1.10
35 to 44	7,000	28	1,600	28	1.00	7,700	29	1,700	28	0.99
45 to 54	4,500	18	1,000	18	1.00	4,000	15	900	14	0.98
55 to 64	2,600	10	600	10	1.01	2,400	9	500	8	0.84
65 to 74	1,200	5	200	4	0.84	1,500	6	300	5	0.81
75 or older	600	3	100	2	0.93	700	3	100	2	0.75
Marital status										
Single (never married)	5,900	23	1,100	20	0.85	4,500	17	1,000	16	0.95
Common-law	4,400	17	1,100	19	1.11	4,000	15	1,000	17	1.14
Married	12,000	47	2,900	51	1.08	12,000	45	2,900	48	1.07
Previously married	3,000	12	500	9	0.79	6,200	23	1,200	19	0.81
Educational attainment										
Less than high school graduation	13,600	54	3,100	54	1.00	14,100	53	3,100	51	0.96
High school graduation	8,500	34	2,000	34	1.02	7,800	29	1,900	31	1.04
Postsecondary diploma	2,100	8	500	8	0.99	3,400	13	900	14	1.10
University degree	1,100	4	200	4	0.83	1,200	5	300	4	0.96
Labour force status										
Employed	15,400	61	3,500	61	1.01	11,900	45	2,900	47	1.05
Unemployed	4,200	16	1,000	18	1.10	2,700	10	600	10	1.01
Not in labour force	5,800	23	1,200	21	0.91	12,000	45	2,600	43	0.95
Income adequacy quintile										
Quintile 1 (lowest)	8,200	32	1,700	29	0.90	10,700	40	2,200	36	0.89
Quintile 2	5,700	23	1,400	24	1.05	5,700	21	1,400	22	1.05
Quintile 3	4,700	19	1,100	19	1.04	4,300	16	1,100	18	1.10
Quintile 4	4,200	16	1,000	17	1.05	3,500	13	900	14	1.08
Quintile 5 (highest)	2,500	10	600	11	1.04	2,300	9	600	9	1.08
Major source of income										
Wages and salaries	15,700	62	3,700	64	1.03	12,300	46	3,000	50	1.07
Self-employment	900	4	200	4	0.98	400	2	100	1	0.79
Government transfer payments	7,000	28	1,600	27	0.98	9,500	36	2,000	33	0.92
Investment	100	1	0	0	0.80	400	1	100	1	0.66
Other	500	2	100	2	0.98	700	3	200	3	1.33
Not applicable	1,000	4	200	3	0.72	3,400	13	700	12	0.96
Activity limitation										
Not stated	300	1	0	1	0.44	200	1	0	0	0.47
No	20,600	81	4,900	85	1.04	22,000	83	5,300	87	1.05
Yes	4,400	17	800	14	0.83	4,400	16	800	13	0.80
Community size										
1,000,000 or more	2,400	9	300	6	0.61	2,200	8	300	5	0.62
500,000 to 999,999	5,900	23	800	14	0.62	6,900	26	900	15	0.59
100,000 to 499,999	2,000	8	300	5	0.67	2,300	9	300	6	0.66
10,000 to 99,999	4,300	17	900	15	0.90	4,700	18	1,000	16	0.88
Less than 10,000	10,800	43	3,400	59	1.39	10,500	40	3,600	58	1.48
Region										
Atlantic Canada	400	2	100	2	1.07	500	2	100	2	1.00
Quebec	3,100	12	500	8	0.69	3,000	11	500	7	0.65
Ontario	2,700	11	500	8	0.74	3,000	11	500	8	0.71
Prairies	15,900	63	3,900	69	1.09	17,000	64	4,200	69	1.08
British Columbia	2,400	9	300	6	0.59	2,300	9	300	5	0.62
Territories	800	3	400	8	2.40	800	3	500	8	2.83
Living on reserve										
Yes	800	3	400	7	2.19	800	3	500	8	2.82
No	24,500	97	5,300	93	0.96	25,800	97	5,600	92	0.94

[1] weighted estimates

Notes: Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.

Source: 1991 to 2001 Canadian census mortality follow-up study

Table C
Demographic, socio-economic and geographic characteristics of in-scope (eligible) Registered Indian census respondents, compared with Registered Indian cohort members, by sex, non-institutional population aged 25 or older at baseline, 1991

	Men					Women				
	In-scope[1]		Cohort			In-scope[1]		Cohort		
Characteristic	Number	%	Number	%	Ratio	Number	%	Number	%	Ratio
Total	**76,900**	**100**	**24,600**	**100**	**1.00**	**93,500**	**100**	**32,100**	**100**	**1.00**
Age group										
25 to 34	31,000	40	10,100	41	1.02	37,600	40	14,100	44	1.09
35 to 44	20,000	26	6,800	28	1.06	24,800	27	8,800	28	1.04
45 to 54	12,100	16	4,000	16	1.02	14,600	16	4,800	15	0.96
55 to 64	7,500	10	2,100	9	0.89	8,800	9	2,500	8	0.83
65 to 74	4,000	5	1,100	5	0.86	5,000	5	1,300	4	0.75
75 or older	2,300	3	500	2	0.65	2,700	3	600	2	0.62
Marital status										
Single (never married)	18,800	24	5,400	22	0.89	16,300	17	5,100	16	0.91
Common-law	13,200	17	4,400	18	1.04	15,100	16	5,400	17	1.05
Married	36,000	47	12,500	51	1.08	42,900	46	16,500	51	1.12
Previously married	8,900	12	2,400	10	0.83	19,200	21	5,100	16	0.77
Educational attainment										
Less than high school graduation	45,500	59	14,700	60	1.01	51,900	55	18,000	56	1.01
High school graduation	24,200	31	7,900	32	1.02	26,800	29	9,100	28	0.99
Postsecondary diploma	5,400	7	1,700	7	0.95	11,900	13	4,100	13	0.99
University degree	1,700	2	400	2	0.67	2,900	3	900	3	0.91
Labour force status										
Employed	37,900	49	12,300	50	1.02	36,400	39	12,900	40	1.04
Unemployed	14,600	19	5,200	21	1.12	10,100	11	3,500	11	1.02
Not in labour force	24,400	32	7,000	29	0.90	47,000	50	15,600	49	0.97
Income adequacy quintile										
Quintile 1 (lowest)	31,900	41	9,700	40	0.95	42,200	45	13,600	42	0.94
Quintile 2	18,600	24	6,400	26	1.07	21,300	23	8,100	25	1.10
Quintile 3	12,400	16	4,300	17	1.07	14,500	15	5,400	17	1.08
Quintile 4	8,900	12	2,800	12	0.99	9,900	11	3,400	11	1.00
Quintile 5 (highest)	5,100	7	1,400	6	0.86	5,700	6	1,700	5	0.85
Major source of income										
Wages and salaries	40,500	53	13,500	55	1.04	38,400	41	13,700	43	1.04
Self-employment	1,600	2	400	2	0.74	1,000	1	300	1	0.88
Government transfer payments	29,700	39	9,500	39	1.00	36,100	39	11,600	36	0.93
Investment	400	1	100	0	0.77	1,000	1	300	1	0.80
Other	2,100	3	600	2	0.88	5,700	6	2,800	9	1.41
Not applicable	2,500	3	500	2	0.60	11,200	12	3,400	11	0.89
Activity limitation										
Not stated	3,300	4	300	1	0.27	3,200	3	300	1	0.31
No	61,700	80	21,100	86	1.07	75,800	81	27,600	86	1.06
Yes	11,800	15	3,200	13	0.85	14,500	15	4,200	13	0.84
Community size										
1,000,000 or more	5,100	7	800	3	0.47	7,300	8	1,200	4	0.48
500,000 to 999,999	6,800	9	1,000	4	0.45	11,300	12	1,700	5	0.44
100,000 to 499,999	6,400	8	1,100	5	0.56	9,200	10	1,700	5	0.55
10,000 to 99,999	11,900	15	2,900	12	0.77	16,900	18	4,000	12	0.69
Less than 10,000	46,700	61	18,800	76	1.26	48,800	52	23,500	73	1.40
Region										
Atlantic Canada	2,800	4	1,200	5	1.29	3,400	4	1,500	5	1.27
Quebec	8,200	11	2,200	9	0.85	9,600	10	3,400	10	1.02
Ontario	15,300	20	4,400	18	0.90	19,900	21	5,500	17	0.81
Prairies	30,400	39	10,100	41	1.04	36,900	39	13,500	42	1.07
British Columbia	17,100	22	5,200	21	0.95	20,200	22	6,400	20	0.92
Territories	3,100	4	1,500	6	1.47	3,400	4	1,800	6	1.50
Living on reserve										
Yes	40,800	53	18,000	73	1.38	38,400	41	22,000	68	1.67
No	36,100	47	6,500	27	0.57	55,100	59	10,100	32	0.54

[1] weighted estimates

Note: A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.

Source: 1991 to 2001 Canadian census mortality follow-up study

Table D
Deaths and age-standardized mortality rates (ASMRs) per 100,000 person-years at risk for Métis and Registered Indians compared with non-Aboriginal cohort members, by cause of death, male non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001

	Non-Aboriginal				Métis				Registered Indians			
			95% confidence interval				95% confidence interval				95% confidence interval	
	Deaths	ASMR	from	to	Deaths	ASMR	from	to	Deaths	ASMR	from	to
All cause	**149,335**	**566.7**	**563.4**	**569.9**	**512**	**781.3**	**715.6**	**853.0**	**2,377**	**886.5**	**851.5**	**923.1**
Infectious diseases	2,137	13.3	12.7	14.0	14	23.1	13.6	39.2	44	17.1	12.7	23.0
Cancer	49,489	187.6	185.8	189.4	119	175.9	146.6	211.0	448	162.5	148.1	178.3
Pancreas	2,338	9.1	8.7	9.5	6	9.3	4.2	20.9	18	6.5	4.1	10.4
Prostate	5,721	17.4	16.9	17.9	12	18.0	10.1	32.3	45	15.8	11.8	21.2
Urinary system	2,681	9.9	9.5	10.3	8	12.2	6.1	24.5	37	13.6	9.9	18.8
Trachea, bronchus and lung	15,210	56.8	55.8	57.8	48	68.6	51.6	91.3	138	49.6	42.0	58.6
Lymp tissue and leukemia	4,589	18.7	18.1	19.3	7	11.4	5.4	24.3	36	13.4	9.7	18.6
Esophagus and stomach	3,261	12.7	12.2	13.2	7	10.4	4.9	22.1	37	13.7	9.9	18.9
Intestine and rectum	6,153	23.1	22.5	23.8	11	16.8	9.2	30.6	51	18.3	13.9	24.1
Other cancer	9,338	39.2	38.4	40.2	20	29.0	18.7	45.1	82	30.1	24.2	37.4
Endocrine system diseases	4,584	17.0	16.4	17.5	22	31.5	20.7	48.0	147	53.9	45.8	63.3
Diabetes mellitus	3,715	13.3	12.9	13.8	19	26.9	17.1	42.4	127	46.4	39.0	55.2
Other endocrine	869	3.6	3.4	3.9	3	4.5	1.5	14.2	20	7.5	4.8	11.6
Mental disorders	2,357	8.1	7.7	8.5	9	14.1	7.3	27.4	70	26.8	21.2	33.9
Nervous system diseases	3,704	13.0	12.6	13.5	10	15.1	8.1	28.2	34	12.5	8.9	17.5
Circulatory system diseases	55,514	192.5	190.8	194.3	169	247.9	212.8	288.7	678	245.7	227.9	265.0
Ischaemic heart disease	34,937	123.2	121.8	124.6	111	166.8	138.2	201.3	426	155.0	140.9	170.5
Cerebrovascular diseases	8,638	28.2	27.5	28.8	25	36.0	24.2	53.5	99	35.4	29.1	43.1
Heart failure	2,505	7.7	7.4	8.0	7	9.3	4.4	19.4	41	14.4	10.6	19.6
Other circulatory	9,434	33.4	32.7	34.2	26	35.8	24.3	52.8	112	40.9	33.9	49.2
Respiratory system diseases	12,915	39.8	39.1	40.5	40	58.2	42.5	79.8	182	64.8	56.0	75.0
Pneumonia	3,717	11.6	11.2	12.0	19	28.9	18.2	45.7	74	26.5	21.1	33.3
Bronchitis, emphysema and asthma	7,288	22.0	21.5	22.5	15	20.5	12.3	34.1	65	23.0	18.0	29.3
Other respiratory	1,910	6.3	6.0	6.6	6	8.9	4.0	19.9	43	15.3	11.4	20.7
Digestive system diseases	5,155	20.0	19.4	20.7	25	38.7	25.9	57.6	149	55.3	47.1	65.0
Cirrhosis of liver	1,823	8.4	8.0	8.9	9	14.0	7.2	27.0	67	25.7	20.2	32.7
Other digestive	3,332	11.6	11.2	12.1	16	24.7	14.9	40.8	82	29.6	23.8	36.8
Genitourinary system diseases	2,394	7.7	7.4	8.0	8	11.5	5.7	23.2	45	16.6	12.4	22.2
Musculoskeletal system diseases	444	1.6	1.4	1.8	3	4.0	1.3	12.4	10	3.7	2.0	7.0
Ill-defined conditions	1,628	8.3	7.8	8.8	6	10.3	4.6	23.1	77	29.7	23.8	37.2
External causes	8,088	53.9	52.5	55.2	82	142.9	114.9	177.8	470	189.4	173.0	207.4
Fall	1,432	5.3	5.0	5.6	6	9.7	4.3	21.6	30	11.3	7.9	16.2
Drowning	268	2.0	1.8	2.3	8	14.2	7.1	28.5	55	22.2	17.0	28.9
Suicide	2,820	21.5	20.7	22.4	20	34.5	22.1	53.7	87	35.8	29.0	44.1
Homicide	197	1.6	1.4	1.9	4	7.7	2.9	20.5	31	12.6	8.8	17.9
Poisoning	383	3.1	2.8	3.5	6	11.1	4.9	24.7	33	13.2	9.4	18.6
Motor vehicle accident	1,630	11.6	10.9	12.2	21	37.2	24.2	57.2	126	51.1	42.9	60.9
Other external	1,358	8.7	8.2	9.3	17	28.7	17.7	46.4	108	43.1	35.7	52.1
Unknown/Other	926	3.8	3.6	4.1	5	8.1	3.3	19.6	23	8.4	5.6	12.7
Smoking-related	25,502	90.9	89.7	92.1	73	103.3	81.9	130.1	249	89.5	79.0	101.3
Alcohol-related	1,875	9.1	8.7	9.6	19	29.4	18.7	46.4	139	53.9	45.6	63.6
Amenable to medical intervention (younger than 75)	7,006	35.6	34.7	36.6	41	62.8	46.1	85.6	162	61.0	52.3	71.2

Notes: Reference population (person-years at risk) for age standardization was taken from the Aboriginal age distribution (5-year age groups). Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classifieid both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study.

Table E
Deaths and age-standardized mortality rates (ASMRs) per 100,000 person-years at risk, for Métis and Registered Indians compared with non-Aboriginal cohort members, by cause of death, female non-institutional population aged 25 or older at baseline, Canada, 1991 to 2001

	Non-Aboriginal				Métis				Registered Indians			
			95% confidence interval				95% confidence interval				95% confidence interval	
	Deaths	ASMR	from	to	Deaths	ASMR	from	to	Deaths	ASMR	from	to
All cause	**103,890**	**318.9**	**316.5**	**321.2**	**377**	**549.0**	**495.6**	**608.2**	**2,129**	**623.7**	**597.7**	**650.8**
Infectious diseases	995	3.4	3.2	3.7	7	10.2	4.8	21.7	62	18.3	14.2	23.5
Cancer	34,325	134.0	132.4	135.7	122	180.1	150.6	215.4	531	156.3	143.6	170.3
Pancreas	1,874	6.3	6.0	6.6	7	9.2	4.3	19.4	25	7.2	4.8	10.6
Breast	6,357	28.9	28.1	29.8	14	21.5	12.7	36.4	83	25.0	20.1	31.0
Urinary system	1,041	3.3	3.1	3.5	5	6.2	2.5	15.1	15	4.3	2.6	7.2
Trachea, bronchus and lung	7,080	28.9	28.1	29.7	33	49.0	34.7	69.0	102	30.1	24.8	36.5
Lymp tissue and leukemia	2,980	10.8	10.4	11.3	9	13.2	6.8	25.4	33	9.6	6.8	13.5
Esophagus and stomach	1,323	4.6	4.3	4.9	5	7.7	3.2	18.4	18	5.3	3.3	8.3
Intestine and rectum	4,406	14.8	14.3	15.4	13	19.3	11.1	33.4	77	22.6	18.1	28.3
Uterus, ovary and adnexa	3,024	13.1	12.5	13.6	16	25.3	15.5	41.3	64	19.0	14.9	24.3
Other cancer	6,105	22.8	22.2	23.5	19	27.8	17.6	43.8	111	32.6	27.0	39.2
Endocrine system diseases	3,472	9.9	9.5	10.3	19	26.3	16.7	41.6	168	49.5	42.6	57.6
Mental disorders	2,435	5.3	5.1	5.6	10	15.4	8.2	28.6	47	13.9	10.5	18.5
Nervous system diseases	3,095	8.7	8.3	9.0	9	13.4	6.9	25.9	25	7.4	5.0	10.9
Circulatory system diseases	39,066	94.0	92.9	95.1	115	160.9	133.6	193.9	570	163.4	150.5	177.5
Ischaemic heart disease	20,432	48.8	48.0	49.6	57	81.0	62.1	105.7	261	74.8	66.2	84.5
Cerebrovascular diseases	8,835	21.4	20.9	21.9	25	34.5	23.2	51.4	141	40.9	34.7	48.3
Heart failure	2,531	4.8	4.6	5.0	6	8.0	3.6	17.9	46	12.6	9.4	16.8
Other circulatory	7,268	16.9	16.4	19.5	27	37.4	25.5	54.8	122	35.1	29.4	42.0
Respiratory system diseases	8,072	19.7	19.2	20.2	27	39.5	27.0	57.7	178	51.3	44.2	59.4
Pneumonia	2,927	6.2	5.9	6.5	7	10.0	4.7	21.2	67	19.3	15.2	24.6
Bronchitis, emphysema and asthma	3,788	9.9	9.6	10.3	14	20.1	11.9	34.2	59	16.8	13.0	21.7
Other respiratory	1,357	3.6	3.4	3.8	6	9.3	4.2	20.7	52	15.1	11.5	19.8
Digestive system diseases	3,872	11.4	11.0	11.9	24	34.3	22.9	51.4	170	50.6	43.5	58.8
Cirrhosis of liver	767	3.4	3.1	3.6	11	16.7	9.2	30.3	83	25.0	20.2	31.1
Other digestive	3,105	8.0	7.7	8.4	13	17.6	10.1	30.6	87	25.6	20.7	31.6
Genitourinary system diseases	1,829	4.4	4.2	4.7	8	13.2	6.3	27.4	49	14.2	10.7	18.8
Musculoskeletal system diseases	745	2.3	2.1	2.5	3	4.6	1.5	14.4	26	7.9	5.3	11.5
Ill-defined conditions	1,146	4.0	3.7	4.3	6	8.8	3.9	19.7	53	15.9	12.2	20.8
External causes	3,899	18.5	17.8	19.2	22	35.0	23.0	53.2	225	67.7	59.4	77.2
Suicide	745	5.7	5.3	6.1	3	4.8	1.6	15.0	35	10.6	7.6	14.7
Poisoning	175	1.2	1.0	1.4	5	8.0	3.3	19.2	34	10.3	7.3	14.4
Motor vehicle accident	752	4.7	4.4	5.1	7	11.2	5.3	23.5	72	21.8	17.3	27.5
Other external	2,227	6.9	6.5	7.3	7	11.0	5.2	23.1	84	25.1	20.3	31.1
Unknown/Other	939	3.2	2.9	3.4	5	7.3	3.0	17.7	25	7.3	4.9	10.8
Smoking-related	11,846	42.2	41.4	43.1	50	73.8	55.9	97.6	169	49.3	42.4	57.3
Alcohol-related	585	2.8	2.6	3.1	11	17.7	9.8	31.9	94	28.5	23.3	34.9
Amenable to medical intervention (younger than 75)	8,160	45.0	43.9	46.0	52	82.5	62.9	108.3	306	92.8	83.0	103.8

Notes: Reference population (person-years at risk) for age standardization was taken from the Aboriginal age distribution (5-year age groups). Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study.

Table F
Unadjusted and adjusted all-cause mortality hazard ratios for Métis and non-Aboriginal members, by sex, non-institutionalized population aged 25 or older at baseline, Canada 1991 to 2001

	Men						Women					
	Unadjusted			Adjusted			Unadjusted			Adjusted		
	Hazard ratio	95% confidence interval		Hazard ratio	95% confidence interval		Hazard ratio	95% confidence interval		Hazard ratio	95% confidence interval	
		from	to		from	to		from	to		from	to
Population group												
Métis	1.34*	1.23	1.46	1.11*	1.01	1.21	1.71*	1.54	1.89	1.51*	1.36	1.67
Non-Aboriginal†	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Age (years)	1.10*	1.10	1.10	1.09*	1.09	1.09	1.10*	1.10	1.10	1.09*	1.09	1.09
Highest educational attainment												
Less than high school graduation	...	...	...	1.37*	1.34	1.40	...	...	...	1.24*	1.20	1.28
High school graduation	...	...	...	1.23*	1.21	1.26	...	...	...	1.14*	1.10	1.18
Postsecondary diploma	...	...	...	1.10*	1.07	1.13	...	...	...	1.06*	1.03	1.10
University degree†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
Income adequacy quintile												
Quintile 1 (lowest)	...	...	...	1.40*	1.38	1.43	...	...	...	1.29*	1.26	1.31
Quintile 2	...	...	...	1.18*	1.16	1.20	...	...	...	1.13*	1.10	1.15
Quintile 3	...	...	...	1.09*	1.07	1.11	...	...	...	1.08*	1.05	1.10
Quintile 4	...	...	...	1.04*	1.02	1.06	...	...	...	1.04*	1.01	1.06
Quintile 5 (highest)†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
Occupation - skilled-based categories												
Professional†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
Managerial	...	...	...	0.99	0.96	1.03	...	...	...	1.12*	1.05	1.20
Skilled/Technical/Supervisory	...	...	...	1.09*	1.06	1.13	...	...	...	1.13*	1.07	1.18
Semi-skilled	...	...	...	1.19*	1.15	1.23	...	...	...	1.12*	1.07	1.18
Unskilled	...	...	...	1.29*	1.24	1.34	...	...	...	1.21*	1.14	1.28
No occupation	...	...	...	1.65*	1.60	1.71	...	...	...	1.50*	1.43	1.56
Community size												
1,000,000 or more†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
500,000 to 999,999	...	...	...	0.99	0.98	1.01	...	...	...	1.02*	1.00	1.04
100,000 to 499,999	...	...	...	0.99	0.98	1.01	...	...	...	1.08*	1.06	1.10
10,000 to 99,999	...	...	...	1.00*	0.99	1.02	...	...	...	1.04*	1.02	1.06
Less than 10,000	...	...	...	0.96*	0.94	0.97	...	...	...	1.03*	1.01	1.05
Place of birth												
Canada†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
Foreign-born	...	...	...	0.76*	0.75	0.77	...	...	...	0.87*	0.85	0.88

† reference category
* significantly different from reference category ($p < 0.05$)
... not applicable

Notes: Métis were defined based on the ancestry responses (see "Derivation of Métis within the cohort"). A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.

Source: 1991 to 2001 Canadian census mortality follow-up study.

Table G
Unadjusted and adjusted all-cause mortality hazard ratios for Registered Indians and non-Aboriginal cohort members, by sex, non-institutionalized population aged 25 or older at baseline, Canada 1991 to 2001

	Men						Women					
	Unadjusted			Adjusted			Unadjusted			Adjusted		
	Hazard ratio	95% confidence interval		Hazard ratio	95% confidence interval		Hazard ratio	95% confidence interval		Hazard ratio	95% confidence interval	
		from	to		from	to		from	to		from	to
Population group												
Registered Indian	1.50*	1.44	1.57	1.19*	1.14	1.24	1.93*	1.85	2.01	1.66*	1.59	1.74
Non-Aboriginal†	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Age (years)	1.10*	1.10	1.10	1.09*	1.09	1.09	1.10*	1.10	1.10	1.09*	1.09	1.09
Highest educational attainment												
Less than high school graduation	...	...	...	1.37*	1.34	1.40	...	...	...	1.24*	1.20	1.28
High school graduation	...	...	...	1.24*	1.21	1.27	...	...	...	1.14*	1.11	1.18
Postsecondary diploma	...	...	...	1.10*	1.07	1.13	...	...	...	1.06*	1.03	1.10
University degree†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
Income adequacy quintile												
Quintile 1 (lowest)	...	...	...	1.41*	1.38	1.43	...	...	...	1.29*	1.27	1.32
Quintile 2	...	...	...	1.18*	1.16	1.20	...	...	...	1.13*	1.11	1.16
Quintile 3	...	...	...	1.09*	1.07	1.11	...	...	...	1.07*	1.05	1.10
Quintile 4	...	...	...	1.04*	1.02	1.06	...	...	...	1.04*	1.02	1.07
Quintile 5 (highest)†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
Occupation - skilled-based categories												
Professional†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
Managerial	...	...	...	0.99	0.96	1.03	...	...	...	1.12*	1.05	1.19
Skilled/Technical/Supervisory	...	...	...	1.09*	1.06	1.13	...	...	...	1.13*	1.08	1.18
Semi-skilled	...	...	...	1.19*	1.15	1.23	...	...	...	1.12*	1.07	1.18
Unskilled	...	...	...	1.29*	1.25	1.34	...	...	...	1.21*	1.15	1.28
No occupation	...	...	...	1.66*	1.61	1.71	...	...	...	1.51*	1.45	1.58
Community size												
1,000,000 or more†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
500,000 to 999,999	...	...	...	0.99	0.98	1.01	...	...	...	1.02*	1.00	1.04
100,000 to 499,999	...	...	...	0.99	0.98	1.01	...	...	...	1.08*	1.06	1.10
10,000 to 99,999	...	...	...	1.00	0.99	1.02	...	...	...	1.04*	1.02	1.06
Less than 10,000	...	...	...	0.96*	0.94	0.97	...	...	...	1.04*	1.01	1.05
Place of birth												
Canada†	...	...	...	1.00	...	...	...	...	...	1.00	...	...
Foreign-born	...	...	...	0.76*	0.75	0.77	...	...	...	0.87*	0.85	0.88

† reference category
* significantly different from reference category ($p < 0.05$)
... not applicable
Note: A total of 2,200 cohort members (800 men and 1,300 women) were classified both Métis and Registered Indians.
Source: 1991 to 2001 Canadian census mortality follow-up study

Table H
Life expectancy at age 25 and percentage surviving to age 75 (conditional on surviving to age 25), Canada, various years

	Men		Women	
Years	Life expectancy at age 25	Surviving to age 75	Life expectancy at age 25	Surviving to age 75
	Years	%	Years	%
1955 to 1957	46.63	46.0	50.96	60.9
1960 to 1962	46.94	46.3	51.84	63.4
1965 to 1967	46.92	46.3	52.57	65.6
1970 to 1972	47.21	46.9	53.41	67.5
1975 to 1977	47.63	48.4	54.29	69.4
1980 to 1982	48.81	52.0	55.29	71.8
1985 to 1987	49.52	54.8	55.77	73.3
1990 to 1992	50.89	59.2	56.77	75.7
1995 to 1997	51.58	61.7	56.96	76.6
2000 to 2002	52.96	66.0	57.76	78.3

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